

# CONTRIBUTION TO THE SURGERY OF THE KIDNEY.<sup>1</sup>

## CASES REQUIRING NEPHRECTOMY.

BY GILBERT BARLING, M.B., F.R.C.S.,  
OF BIRMINGHAM, ENG.,

Professor of Surgery in the University of Birmingham; Surgeon to the  
Birmingham General Hospital.

CASE I.—*Renal Mobility with Tumour (Hypernephroma) causing Pyloric Obstruction; Nephrectomy, with relief of symptoms.* A lady, aged 50, consulted me on March 1, 1905, for pain in the right side of the abdomen and extreme constipation. For four years she had been a complete invalid, unable to do any work, even such as the supervision of her house involved, and during the last few months of that time she had practically been confined to bed and only able to take fluid diet and semi-solids. Even with this extreme care in dieting she occasionally vomited, and the consumption of solid food practically always gave rise to vomiting. Rest in bed made the patient feel more comfortable, but even then indigestion was very troublesome and she had lost weight to an extreme degree.

On examination it was found that the stomach was dilated and proptosed; the lower border on distension reached nearly three inches below the umbilicus; no peristalsis could be observed or elicited. There was a rounded mass in the right loin, which appeared to be continuous with the lower end of the right kidney, from which it could not be separated, the kidney was almost entirely below the costal arch, was freely movable and could be pushed bodily upward with the tumour, but it could not be completely replaced in the loin.

It seemed doubtful whether the patient was the subject of an actual stenosis of the pylorus, or whether the displaced kidney and the tumour attached to it interfered mechanically with the pylorus and duodenum by dragging on these structures. To

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<sup>1</sup> Read at the meeting of the Midland Medical Society, December 6, 1905.

enable one to deal with any condition present it was decided to open the abdomen anteriorly rather than to attack the renal tumour from the loin.

Operation by incision through the right rectus. The pylorus was not stenosed, as the index-finger could be invaginated through it. The peritoneum was therefore divided over the right kidney to the outer side of the colon, and it was then found that there was a rounded elastic mass about the size of an orange connected with and partly enveloping the lower end of the kidney. (Fig. 1.) The nature of the tumour was doubtful, and as it might prove to be malignant it seemed better on the whole to remove the kidney and tumour together rather than to do resection of the kidney. Palpation of the left kidney showed that it was a healthy and well-formed organ, and nephrectomy was therefore performed. The tumour was found to be closely associated with the second part of the duodenum; so closely, in fact, that the outer coats of the intestine were injured and required suturing.

A good recovery followed the operation and within three weeks the patient was able to take solid food, meat and vegetables, in carefully administered quantities.

I have not seen her since she left the Nursing Home, but on inquiry by letter learn that she is immensely benefitted, though she still gets indigestion and flatulence; she has gained weight and is able to get about and do a certain amount of work, and she speaks of "her wonderful health in comparison with that of the last few years."

The inability of the stomach to discharge its functions and the resulting wasting may have been brought about either reflexly by the weight of the kidney and tumour dragging on the renal plexus, especially in the vertical position, or by kinking of the duodenum from the sagging downward of the tumour, which was closely attached to the second portion of the bowel. On the whole I am inclined to regard the second explanation as the correct one.

The association of renal mobility with dilatation of the stomach is not rare, and the question often arises, are these two displacements simply the results of a common factor, or



FIG. 1.—Showing the kidney unopened with the tumor at the lower end.

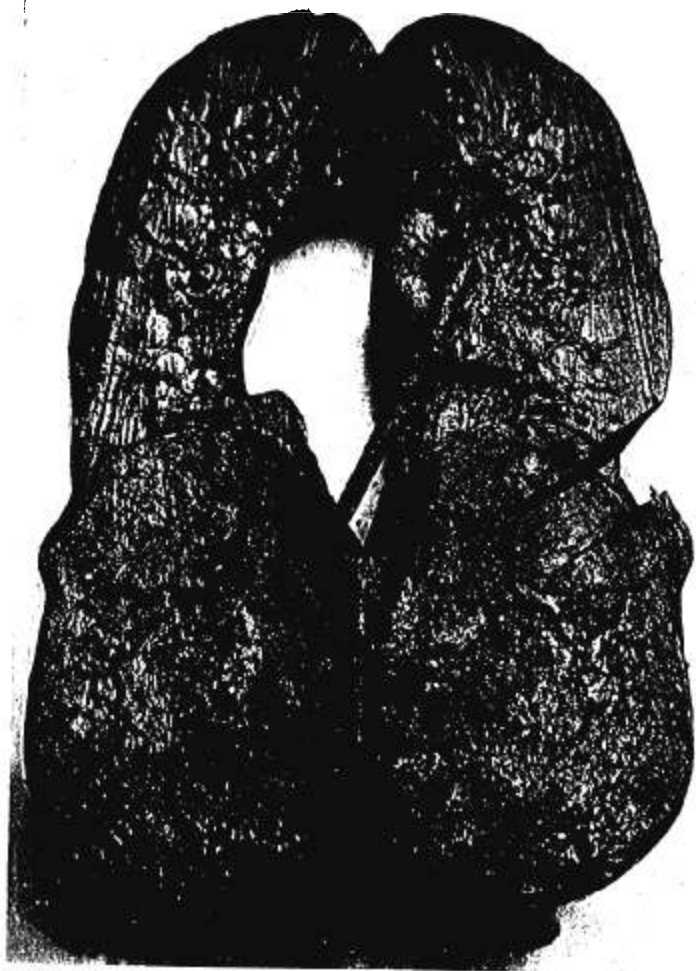


FIG. 2.—Showing a section of the kidney and growth.

does the first stand in causal relation to the second? The symptoms present are often those of neurasthenia, with vague pains and discomforts and stomach indigestion. Are the symptoms due to the descent of the kidney, or is the stomach to bear the onus of them? The answer is often difficult, but the case just related appears to shew that the drag of an unusually heavy kidney may be sufficient to interfere mechanically with the emptying of the stomach.

The removed specimen is in the Museum at the University, and I have to thank Dr. Hewetson, curator of the surgical portion, for the following account of the pathology of the tumour and for the photographs which illustrate it.

REPORT.—The tumour is situated within the capsule of the kidney and occupies the lower half of the entire organ. (Fig. 2.) It is roughly pear-shaped, the apex being uppermost, and has the following dimensions: Length (vertical) 8 cm., breadth (lateral)  $5\frac{1}{2}$  cm., thickness (antero-posterior) 6 cm. The growth is definitely circumscribed by a dense fibrous capsule which separates it clearly from the kidney tissue above. The tumour substance resembles in appearance that of a deciduoma malignum, and consisted when fresh of a maroon-coloured spongy tissue with small areas of a firmer pinkish medullary tissue.

There are no visible trabeculae passing from the capsule into the interior of the growth, and it can be stripped away from the capsule without much difficulty.

The naked eye appearances are those of a localised tumour beginning in the kidney tissue and presenting extensive areas of necrosis, or of old blood extravasation. The kidney tissue above the tumour, measuring about  $8\frac{1}{2}$  cm. in length, is to all appearances healthy. The capsule of the kidney can be readily stripped from the renal parenchyma, but is very adherent to the tumour.

The ureter is normal, the renal pelvis is slightly dilated. The renal vessels exhibit no special peculiarity.

*Microscopical Characters.*—A section was taken opposite the upper part of the tumour, involving an area equal to about one-third its diameter. Externally there is a dense capsule consisting of concentric layers of fibro-muscular tissue; within this are layers of fibrous tissue in whose meshes are flattened kidney

tubules representing the kidney tissues which had become flattened and attenuated by the slow expansion of the tumour. Within this again is a further concentrically-arranged fibrous layer representing probably the capsule proper of the tumour. From this layer very delicate septa pass into the soft substance which comprises the new growth. This consists mainly of masses of old blood-clot shewing red corpuscles, white corpuscles and granular debris. The pinkish islets of tissue previously mentioned indicate the real nature of the growth, and this consists of epithelial cells cubical or polyhedral in shape arranged as delicate papillomata. (Fig. 3.) Each papilloma consists of a thin stem of areola-fibrous tissue covered by a single layer of cubical or polyhedral cells containing clear transparent protoplasm and a well-stained nucleus situated about the middle of the cell. (Fig. 4.) The delicate papillomata are arranged in a complex dichotomous manner. The tumour is very vascular, being supplied with large thin walled sinuses within the substance of the tumour and by large thick walled vessels within the meshes of its fibrous capsule. There is evidence of extensive extravasation, which cutting off the blood supply from large areas of papillomata, these have become degenerate and necrotic. There is no evidence of cyst formations within the tumour.

It would appear that this type of tumour, though moderately well known to pathologists, is little if at all known to surgeons. It has previously been regarded as adenoma, lipoma, angioma, endothelioma and carcinoma of the kidney. In 1883 Grawitz asserted that this type of growth was developed from misplaced portions of suprarenal tissue, and not from uriniferous tubules or the endothelium of lymphatics.

This view of Grawitz is generally accepted now and the tumour has been called by such names as Hypernephroma and *Struma suprarenalis*.

A critical review of this type of growth was given by A. O. J. Kelly (*Phil. Med. Jour.*, July 30 and Aug. 6, 1898); they are always soft and marrow-like and invariably definitely encapsuled. Occasionally they grow to a considerable size. They rarely produce hæmaturia; they are prone to interstitial hæmorrhages; they occasionally shew malignant characters,



FIG. 3.—Showing the complex dichotomous branching of the papillomata.

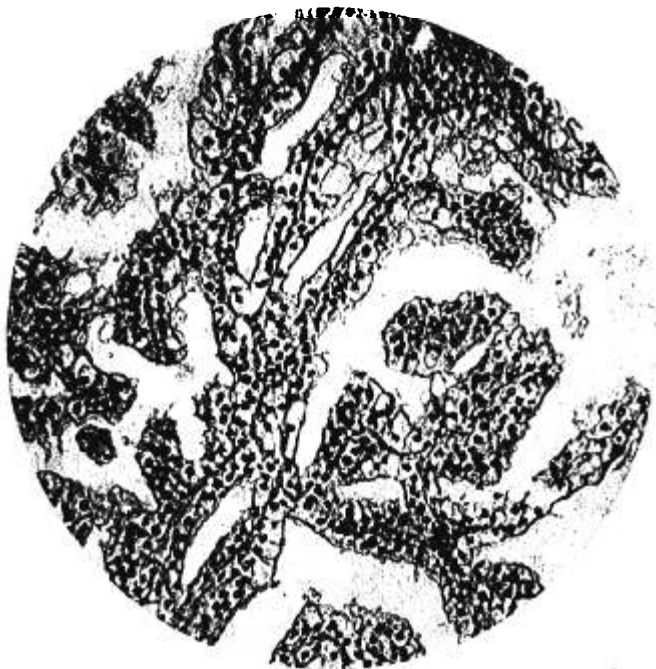


FIG. 4.—Showing the character of the epithelium covering the slender papillary growths.



giving rise to metastases in lung, liver and bones. Nearly all the reported cases have occurred in men and women between 40 and 50.

The next case is also one of great interest both from the clinical and the pathological standpoint.

CASE II.—*Pyelo-nephritis and Ureteritis of uncertain nature. Nephrectomy.* Recovery. A male, aged 26, was admitted to the General Hospital in May, 1905, for pain in the left loin and down the course of the ureter. For some twelve years the patient had suffered discomfort in the penis after micturition, the urine being generally turbid. Six years ago this inconvenience became worse, pain in the back was complained of, the urine became more turbid and a deposit of mucus was noticed in the chamber. Still later pain was complained of in the upper part of the thigh. All these symptoms were present at the time of admission, but were none of them very acute, though from time to time they caused the patient to rest from work for a day or two. No enlargement at the kidney could be felt, but there was tenderness over the organ. Examination of the urine shewed a small quantity of pus but no blood crystals or tubercle bacilli. Cystoscopic investigation failed to shew any condition in the bladder which might explain the symptoms; the left ureteral orifice did not appear to differ from the right.

The patient was again admitted to hospital in September, 1905, with all his symptoms worse, willing now to submit to operation, as his disablement was increasing and he had not been able to work at all for some weeks. The urine at this time was acid, it contained pus, but blood crystals and tubercle bacilli were still absent.

*Operation.*—The left kidney was exposed by the usual oblique lumbar incision; its pelvis was found to be dilated and much thickened but no calculus could be discovered. The ureter was then examined and found to be densely thickened and enlarged nearly to the size of the little finger at its upper part, gradually diminishing in size toward the bladder, though it was still unhealthy to within an inch of the organ. The diagnosis appeared still to be tubercular disease. The peritoneum was opened at the bottom of the wound and the hand passed across determined

the presence of the right kidney, which appeared to be free from any gross change. Nephrectomy and complete ureterectomy was therefore performed, as any less procedure did not promise to restore the patient to active work as a coach finisher. An easy recovery followed the operation and the patient is now well.

The method of examining the opposite kidney before proceeding to nephrectomy is one which is no doubt often resorted to by other surgeons, but it appears worth while calling attention to it, as it may not be generally practised. Complete ureterectomy was effected simply by enlarging downward and forward the lumbar incision, a method by which I have been able also to remove a calculus impacted in the ureter close to the bladder without making a second incision in the iliac region. In my experience there is scarcely any limit to what may be done in the way of removal of huge enlargements of the kidney and the ureter through this prolonged lumbar incision. If need be there is ample evidence in some of the cases I relate here of the wisdom of keeping kidney operations retroperitoneal rather than intraperitoneal whenever this can be done.

*Pathological note and photographs of the specimen by Dr. Hewetson.*—The capsule of the kidney is thickened but strips without much difficulty, the kidney pelvis is dilated and its walls thickened and indurated. The ureter has the calibre of a cedar pencil and possesses thickened walls. On section it is readily seen that the chief seat of the trouble lies in the pelvis and ureter; both are lined by a whitish granular layer, which largely accounts for the thickening and induration of their walls. No calculus can be discovered. The kidney tissue is of a pale pink colour and cuts very much like that of a lardaceous kidney, although there is no characteristic stain if iodine is applied. The cortex is not altered in size; the medulla is somewhat congested. There are no abscesses visible to the naked eye within the kidney tissue. At one or two points the granulation tissue lining the smaller divisions of the kidney pelvis appear to have burst into the medulla of the kidney and formed very small abscesses there. At the upper pole of the kidney there are one or two shrunken areas of kidney tissue shewing a brownish red colour on the sur-

face; these are probably either of a thrombotic or infarctic nature. The blood-vessels of the kidney are normal.

*Microscopical.*—The kidney tissue everywhere shews advanced parenchymatous nephritis, with destruction of glomeruli and kidney tubules over extensive areas. This destruction is due no doubt to the infiltration of the interstitial tissue with small round cells which are diffusely arranged in both cortex and medulla. This inflammatory reaction is widespread and not arranged in tubercle formations.

The kidney pelvis and ureter are enormously thickened, this being due almost entirely to an inflammatory change in the mucous and sub-mucous coat. This consists of the breaking up of a thick layer of round cells chiefly of a mononuclear variety, which either lie in the sub-epithelial layer or entirely replace the epithelial cells. There are no giant cells anywhere and no suggestion of tubercle formations.

The nature of the pathological process is probably that of a sub-acute inflammation arising in the pelvis or ureter of the kidney and which has gradually spread to the kidney tissue. From the histological character of the sections of kidney tissue, pelvis and ureter, one would infer that this is probably an inflammatory process of a simple pyogenic nature and not of a tuberculous one, although no cause such as calculus was found to originate the condition.

CASE III.—*Intermittent Hydro-nephrosis with extreme mobility of the kidney. Nephrectomy.* Recovery. This specimen was removed from a lady, 35 years of age, who had since early childhood suffered from attacks of pain in the right side of the abdomen and the right loin, pain which at times was very severe and caused vomiting and which for some years had been associated with a swelling in the right anterior renal region, the swelling from time to time subsiding with an increased excretion of urine which occasionally would be coffee-coloured, suggesting that there was blood in it. When I first saw the patient she had a swelling as large as a child's head, entirely below the costal arch on the right side and reaching back into the loin; it was fluctuating and freely movable, both vertically and laterally.

*Operation* by the usual oblique lumbar incision. After pal-

pating the left kidney in the manner I have already described and finding it plump and healthy and not unduly movable, the right kidney was removed, as it was found that the kidney tissue was reduced to a mere shell; there was hardly anything but the capsule left. The attachment of the ureter to the kidney pelvis was such that an incomplete emptying of the pelvis must have been habitual. It is of course in this case impossible to say whether the mobility was the first fault which so kinked the pelvis and ureter as to cause distension of the organ, or whether some congenital fault in the attachment of the ureter to the kidney pelvis was the first cause of the hydronephrosis and the intermittent emptying of the organ produced displacement of structures around and secondary mobility. I incline to think that the mobility of the kidney was the first step in the destructive processes that had gone on. Certainly this is so in some cases, of which the following is an example:

A year ago a lady, aged 45, was sent to me by Dr. Roberts, of Dursley, with a history extending over thirteen years, of pain in the right side of the abdomen which came on after an acute illness. Ever since that illness from time to time there had been pain in the right side of the abdomen and the right loin; the pain was made worse by exertion, and it was also especially bad when the patient was tired; occasionally vomiting was associated with the pain. At times micturition was very frequent, and at others the patient was unable to pass urine without great difficulty. On examination the right kidney was found freely movable either in the recumbent, lateral or vertical positions; the left kidney could not be felt.

I performed nephropexy by the method I generally adopt, a modification of Goelet's, and found a considerable degree of hydronephrosis, so that nearly half the kidney tissue was destroyed; there was an abnormal renal artery at the lower pole of the kidney.

During the first few days after the operation there was great discomfort and dysuria. These symptoms were so severe that it appeared doubtful whether nephrectomy would not be required, but the acuteness of the symptoms gradually subsided, and when the patient got up at the end of four weeks she was perfectly comfortable and has remained so ever since.

A year after her operation she reported herself as feeling strong and well, and able to walk four or five miles without difficulty. She and her husband stated that the improvement in her health since the operation was marvellous; that she was now able to undertake duties which before were quite impossible for her; that her life was not only more comfortable but that mentally she was quite different, bright and happy, instead of being depressed and morbid.

I mention this case to shew that mobility may be an efficient cause of hydronephrosis and that fixation of the movable organ may suffice to prevent further deterioration of the kidney and at the same time give relief to the distressing symptoms.

The earlier part of this year I was consulted concerning the wife of a medical man who was very seriously ill from a right-sided pyonephrosis, associated with mobility of the right kidney. It appeared to me from the history in this case that there was some hydronephrosis due to movement and that infection invaded the distended organ, setting up an acute pyonephrosis. Happily the purulent collection eventually discharged itself down the ureter and the urine became almost, but not quite, free from pus after prolonged rest and treatment. Further examination of this patient shewed that both kidneys descend freely when she is in the upright position, and a past history of many years of indifferent health, weakness, exhaustion, and inability for a really active life points strongly to the mobility of her kidneys as the cause of her incapacity. Some three months ago I ordered her a double truss support to keep the displaced organs in position, and she is one of the fortunate patients who has derived very great benefit from this measure for she writes me, within the last few days, that her life is quite different since she has had the benefit of the instrument, and that she is now able to undertake duties that were before quite impossible for her.

I mention this case in conjunction with the preceding ones to point out one of the dangers to which patients with hydronephrosis are exposed, viz., to infection of the dilated

tract and resulting pyonephrosis, and I will illustrate this by referring to two other cases which possibly arose in this way.

The two cases next reported are both examples of unilateral pyonephrosis, which appear to have arisen without the provocation of *calculus or tubercle*. Case IV. was probably due to some congenital defect or displacement, for in this instance there is a long-continued history, beginning in young childhood, of attacks of pain in the left renal region associated at times with vomiting. In all probability hydronephrosis was set up which eventually became infected, pyonephrosis resulting. When the patient came under observation he was most gravely ill and the diagnosis, between an acute thoracic and acute abdominal condition, was very difficult. At this time he was far too ill to permit of any operative interference whatever the diagnosis might be, and it was hoped that by withholding operative interference he might struggle through to a more favourable period. This fortunately happened and it became clear that the condition was located in and around the kidney.

In Case V. there was a marked contrast to the very acute and severe illness of the case just mentioned.

This patient was in comparative health and the renal swelling was discovered almost accidentally when he was still following his occupation and apparently without much inconvenience. Neither in the history nor in the removed specimen is it possible to trace the provocative conditions which set up pyonephrosis, but I suspect that in many of these unexplained cases there is in the first instance hydronephrosis either from mobility or from some malformation about the ureter or kidney pelvis.

CASE IV.—*Huge Pyonephrosis and Pyonephritic suppuration with acute symptoms, partly abdominal, partly thoracic. Lumbar Nephrectomy.* Recovery. A male, aged 25, was admitted to the General Hospital under the care of Dr. Simon, September 7, 1905, complaining of severe pain in the left side of the chest and abdomen.

On the day of admission the patient had an attack of acute pain in the left side affecting the back, extending round to the

front of the abdomen and involving the lower part of the left chest where there was severe stabbing pain, worst on deep respiratory effort. When I first saw him the patient was extremely ill; pulse 140; temperature 102; respirations 44. The belly was rigid, the thoracic movements were slight and mainly of the upper part. The diagnosis was uncertain whether acute abdominal lesion or pneumonia with latent physical signs. The history that ever since five years old the patient had suffered acute attacks of pain in the left loin suggested that a plugged kidney with distension and infection spreading from it was the probable cause of the present illness. The delay of a few days materially cleared up the diagnosis; a few blood cells were found in the urine on two occasions; the pain and tenderness became more definitely localised over the left kidney; a large mass could be felt occupying the left lumbar region; the pulse fell to between 80 and 90; the temperature also falling somewhat and becoming of the hectic type.

Operation.—Lumbar incision liberated a perinephritic abscess of some ounces and the kidney was found hugely dilated and extending up to the left arch of the diaphragm above and to the crest of the ilium below. It was shelled out without much difficulty, the vessels and ureter were ligatured separately. A bougie was passed down the ureter into the bladder and the tube was found patent. A good recovery followed.

Examination of the specimen shewed that the whole of the renal tissues were practically destroyed, the distended parts being filled with pus, and there was no evidence of calculus or tubercle to explain the condition found.

CASE V.—*Large Pyonephrosis simulating a Hepatic Tumour. Nephrectomy by abdominal incision.* Recovery. A male, aged 35, was admitted to the General Hospital on September 11, 1905, with a large abdominal tumour reaching from the right costal margin to the iliac fossa and extending laterally from the right side of the abdomen to some inches beyond the middle line. The swelling was very slightly tender, doubtfully fluctuating; it was mobile laterally, and descended somewhat on inspiration. There was stomach resonance over the inner and upper part of the swelling, colon resonance over the front of it could not be made out distinctly, and on palpation the hand could not separate

the upper margin of the swelling from the liver. Bimanual palpation shewed that the swelling did not occupy the lumbar space as fully as was to be expected from renal enlargement. There was no history of any recent inconvenience from the swelling, but the patient stated that he had suffered pain in the right loin three years previously and that his urine was turbid then. Examination of the urine shewed a very few pus cells and the excretion of urea was something under 300 grains.

*Operation.*—Although there were some points suggesting that the tumour was renal, in view of the uncertainty of the diagnosis an incision was made over the front of the abdomen, when it was found that the tumour was free from the liver and that it was connected with the right kidney. Part of the swelling was fluctuating, but a great deal of it appeared to be solid. The peritoneum over the swelling was opened to the outer side of the colon, the colon and duodenum were stripped off the front and inner side and pushed toward and beyond the middle line. During this manipulation a small collection of pus was liberated. As the stripping proceeded it was found that the innermost part of the swelling was closely adherent to the inferior vena cava, which was separated with great difficulty but without a catastrophe. The renal vessels were ligatured separately, the parts were restored to their natural position and the cavity left was drained by lumbar puncture and the anterior wound entirely closed. Some large lumbar glands were removed, there being suspicion that the condition was really one of pyonephrosis with malignant growth.

The report on the specimen by the pathologist, Dr. Sawyer, shewed that the condition was one merely of pyonephrosis with great thickening in parts of the capsule of the kidney, and the lymphatic glands were also shewn to be free from growth. There was no evident cause such as calculus or tubercle for the condition found.

CASE VI.—*Pyonephrosis with large perinephritic suppuration due to renal calculus. Nephrectomy.* Recovery. A male, aged 58, was admitted to the General Hospital on October 7 with a large abdominal tumour on the left side which had been discovered recently, the man seeking advice because of a feeling of stiffness on the left side which caused him some inconvenience



when at work. The left side of the abdomen was occupied by an elastic swelling, which extended from beneath the costal arch down into the iliac fossa; it reached to the middle line and filled the left lumbar space. The swelling was not tender and was doubtfully fluctuating. The time at which this swelling developed was quite uncertain, for the patient practically knew nothing of it, but he stated that twelve months before he came under observation he had suffered severe pain on the left side of the belly when he was in bed one morning and was sick for about twelve hours then. Since that time he has had what he calls a feeling of bubbling in the left renal region pretty often. The patient states that he has noticed his urine thick and cloudy for the last forty years, and he thinks that at one time he passed blood in it after cycling; he also noticed that he passed urine rather frequently during the day but not so frequently when at rest. He was a well-nourished and muscular man, but his surface arteries were much thickened and tortuous. The examination of the urine shewed constantly the presence of pus and there was a good excretion of urea, amounting to about 300 grains, on a light diet. The diagnosis appeared to be pyonephrosis, probably from plugging by a stone, and nephrectomy was advised.

*Operation*, October 16, by a prolonged oblique lumbar incision, which opened a perinephritic suppuration estimated at about two pints, the pus being of a peculiar mucus sticky feel but without odor. The kidney was then defined and after much trouble a line of cleavage was obtained, but in the process of stripping the organ the peritoneum was widely opened and it was with much difficulty that the descending colon could be separated from the front of the kidney; indeed it was feared that some of its vessels had been disturbed, but subsequent events shewed that this was not so. It was impossible to suture the opening in the peritoneum so the wound was partly sutured and partly packed with gauze; this latter precaution was especially taken in view of the possibility of necrosis of part of the colon wall from the disturbance it had suffered. Happily the wound healed without any trouble whatever, the bowel remained sound, and the patient was discharged on November 10.

The kidney was widely dilated and practically no renal tissue was left; the dilatation was found to be due to a calculus in the pelvis.